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ABSTRACT

In the course of carrying out the technical tasks of the school, teachers encounter common problems that do not impose on those in managerial roles. School organizations are typically structured in such a way as to prevent the information sharing and processing necessary to confront these problems. A collective decision-making structure for teachers is needed to supplement the traditional institutional decision-making structure of the school system. This paper describes and evaluates a survey-feedback-based, problem-solving structural intervention originally conceptualized and tested in an earlier experiment. A three-year project using a refined version of an earlier design and a quasi-experimental research design is reported on in this document. Results of the project were generally favorable, with teachers taking a greater role in decision-making, but a need was seen for further work to make the system compatible with the existing wide range of school patterns and needs. (Author/PGD)

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DEVELOPING TECHNICAL CORE PROBLEM SOLVING IN SCHOOLS: AN EMPIRICAL TEST OF A STRUCTURAL INTERVENTION*

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Developing Technical Core Problem Solving in Schools: An Empirical Test of a Structural Intervention

The objective of this paper is to evaluate a particular school-specific organization development intervention in terms of its express theoretical foundations. The paper will present the theoretical foundations for the intervention design, the results of quasi-experimental evaluation of the implementation project, and a reconsideration of the theory in light of the results.

The O.D. intervention being evaluated in this paper is a Survey-feedback based, problem-solving structural intervention conceptualized and tested by Coughlan, Cooke and Safer (1972) in an earlier field experiment. A three-year O.D. project using a refined version of the intervention design and a quasi-experimental research design was recently concluded (Duncan et al., 1977), and will be reported in this paper. This project was funded by the National Institute of Education.

I. THEORY AND DESIGN

Introduction

The O.D. intervention was designed to increase organizational flexibility by providing for increased professional problem-solving in schools. The design of the intervention stems from several theoretical foundations. Open systems contingency theory suggested the need for structures and processes in schools to address uncertainty at both the institutional and technical core levels. Although the administrative structure is designed to reduce and buffer teachers from uncertainty at the institutional level, uncertainty from the internal environment (i.e., from students and the

technology of teaching) is optimally handled by the teachers who perform the technical core task. Structures to promote collegial problem-solving in schools and to reduce the relative isolation of teachers from one another should therefore enhance the ability of the school to respond to problems at the technical core level.

If lasting change is to occur, innovation and change theory suggested the need for a systematic change process which attended to the evaluation of need for change right through to working out the "bugs" and routinizing a change program. The components of this intervention are designed to support a seven-stage "collective decision process." The internal change agents received training in the seven stages and the use of the structures and processes of the intervention to achieve affective change.

The particular components of the intervention are based on the literature of planned change and applied behavioral science. These include the use of peer groups to solve problems, link-pin or overlapping groups to integrate the decisions of the faculty groups with the authority structure, task-oriented feedback to initiate problem-solving efforts (Nadler, 1976; Miles et al., 1969) and training of internal change agents to enhance the probability that the collective decision making structures be able to continue without ongoing involvement of external change agents.

The intervention was theoretically predicted to improve organizational effectiveness through the increase in faculty professional problem-solving and decision-making activities and improvement in organizational flexibility and adaptability, and to improve teachers' work attitudes by affording teachers increased influence over decisions that directly affect their work.

Theoretical Background

The rationale behind the intervention's design and descriptions of the design itself have been developed at length elsewhere (Cooke, 1973; Coughlan, Cooke and Safer, 1972; Duncan et al., 1977; Mohrman, Cooke and Duncan, 1975; Mohrman, Mohrman, Cooke and Duncan, 1977; Mohrman, Mohrman and Duncan, 1976).

Parsons (1960) and Thompson (1967) suggest that organizations consist of at least three levels of control and responsibility: the institutional, the managerial and the technical. The institutional subsystem is the interface with the external (institutional) environment of organizations and is the part of the system which responds to and is sensitive to environmental shifts. In schools this level is embodied in the school board and to some extent in the district level administration. The managerial subsystem further buffers the technical subsystem from the institutional environment by such activities as providing the resources needed to perform the technical activities. These managerial functions in school organizations are performed by district administrative personnel and school principals. At the technical level, problem solving and decision making is centered around the core task of the organization. In schools this task is performed by the teachers and other professionals dealing with the students.

In this model, it is usually assumed that buffering the technical core from the institutional environment will remove most of the uncertainty from technical tasks and allow for maximum rationality to be applied to them. In schools, this is not possible since students bring a considerable amount of variability and turbulence to the task environment. In addition the technology of instruction is considerably underdeveloped

for coping with this environment (Hawley, undated; Dreeben, 1970; and Lortie, 1975). The technical core, therefore, is faced with considerable task uncertainty in schools, uncertainty that cannot be buffered or absorbed by the managerial and institutional levels.

The technology of schools seems to a great extent to fit Thompson's definition of an intensive technology, in which "...a variety of techniques is drawn upon in order to achieve a change in some specific object, but the selection, combination, and order of application are determined by feedback from the object itself." (Thompson, 1967, p. 17). The average student, for example, when in elementary school is taught by at least six and probably as many as 15 professional educators of varying specialties. A child who presents special problems may see many more. According to Thompson, "the successful employment of an intensive technology rests on the availability of all the capacities potentially needed, but equally on the appropriate custom combination of selected capacities as required by the individual case or project" (p. 18). Thus, although the staffing of the organization with the necessary specialties is a managerial-level function critical to the successful use of an intensive technology, the combination of these specialties in treatment of students depends on feedback from the individual student, and becomes a necessary technical core responsibility.

Knowledge of the salient characteristics of children and the teaching techniques appropriate to them, while advancing, still is limited. Thus, uncertainty is introduced into the technical core tasks both by the variability of the material (children) and the difficulty of determining generalized decision rules for assigning treatments to individuals (Perrow,

1967). In addition, uncertainty is introduced by the dynamic nature of the technology. New curricula and teaching equipment and techniques are being continually introduced, especially during the last two decades.

Contingency models (eg. Thompson, 1967; Galbraith, 1973) often suggest that environments and technologies leading to high task uncertainty and high task interdependency require structural relationships capable of a high degree of information processing such as face to face work groups or lateral relationships. Such structures seemingly necessitated by this technical task uncertainty have also been called "collegial" structures (Becker and Neuhauser, 1975).

In the course of carrying out the technical tasks of the school, teachers encounter common problems which are not salient to those in managerial roles. The solutions of these problems demand the exchange of information, pooling of ideas, and the coordinated implementation and evaluation of new programs and procedures (Mohrman et al., 1975). In addition to the large amount of information processing that ideally accompanies the correct matching of students with learning experiences, the introduction of new strategies and specialties themselves creates the need for increased information processing (Galbraith, 1973, p. 19). School organizations, however, are typically structured in such a way as to prevent the information processing necessary to confront the problems faced at the technical core (Dreeben, 1969; Hawley, undated). The structural response in schools is typically one of high isolation and autonomy for the teacher. Although the autonomy allows the individual teachers to freely use professional training and thereby absorb some uncertainty through flexibility of skilled behavior, this structural arrangement does not meet the information needs nor address the interdependencies among

tasks performed by school personnel.

The employees in schools, as in many intensive technology organizations fit at least some of the characteristics that are generally considered to describe professionals (Hall, 1968; Vollmer and Mills, 1966). Of particular importance here is the fact that teachers have had a specialized education and frequently an advanced degree. The advancement of knowledge concerning learning and teaching has resulted in a proliferation of teaching specialties. Also, despite the fact that they are almost always housed in bureaucratically structured school systems, teachers have a norm valuing professional autonomy. Because of the professional nature of the staff of a school, teachers are competent to identify and solve problems, and they are motivated to have a voice in the decisions that are made concerning their work, especially in those areas referred to above.

The two environments, institutional and technical, therefore present the need and motivation for two decision making or problem solving structures, an authority structure and a collegial structure (Hanson, 1975). Schools by and large provide rather specific, highly formalized authority structures but often leave the collegial structures to emerge informally. Informal control structures can be dysfunctional in that they may be perceived as in opposition to the formal authority structure rather than as complementary to it. The design imperative for public school organizations, which by and large have formalized their decision making structures only with regard to their institutional environments, is to establish a formal collective decision making structure which deals primarily with the technical environment, but which is appropriately integrated with the authority decision-making structure.

The Design of the OD Program

The OD intervention was intended to augment the structure of schools to be more congruent with their dual contexts, in particular to provide collective decision making structures to supplement the pre-existing hierarchical authority structure. In general, the intervention is a form of OD or planned organization change in that it utilizes techniques identified with OD, for example, survey feedback and group problem solving. There are some differences between it and other earlier OD efforts which are important to state. First, rather than aiming to increase participation in the existing authority decision making process as is tacitly assumed in almost all interventions dealing with decisional participation this intervention provided for participation in a new collective decision making structure. Second, the intervention was aimed at setting up structures for task-oriented problem solving and interpersonal processes were attended to in order to reinforce the new structures rather than focusing on improving interpersonal processes within existing structures. Third, the interventionists did not personally implement nor function within these new structures. In order to minimize system reliance on the interventionists, internal change agents were trained from each experimental school to implement and assume roles within the new structure. Specifically two teachers were trained to lead group problem solving (the leader) and to monitor group processes (the monitor). Each principal received similar training in leadership, change and group problem solving processes.

There were two ways in which the intervention was structured. First, a structure of roles and group membership was implemented to serve as the locuses or forums in which the collective problem solving processes were

to take place. Second, the processes themselves were "structured" so that the individuals and groups followed as closely as possible an "ideal" problem solving process. Certain activities were designed into the process and identified as functions of particular groups and individuals so that the relationships between the role/group structure and the structure of the process and its subprocesses were as clear as possible.

The role consisted fundamentally of a series of overlapping groups. Figure I.1 shows the groups pertinent to the typical elementary school and the membership of the groups. Table I.1 specifies the functions of these groups. The bulk of the collegial problem solving process in the schools was designed to take place in the program group, consisting only of teachers. The peer-level make-up of the group accentuated the distinction of this structure from the existing authority structure and was expected to eliminate dysfunctional effects of the principal's presence on group creativity and productivity (Bridges, 1967). The review group functioned as the major structural link between the existing authority structure and the superimposed collegial decision making structure. The review and program groups are linked by the overlapping membership of the program group leader and process monitor, the two completely new roles created by the design. The tasks of the teachers who filled these roles included process initiation, facilitation, and leadership in the program group, group spokesmen in the review group, and communication links between the two. The third group, the policy group, is basically analogous to the review group but allows linkage of the process at the school level with the district level authority structure.

Survey Feedback was used to stimulate problem identification and subsequent solution generation by teachers. The faculty in each school

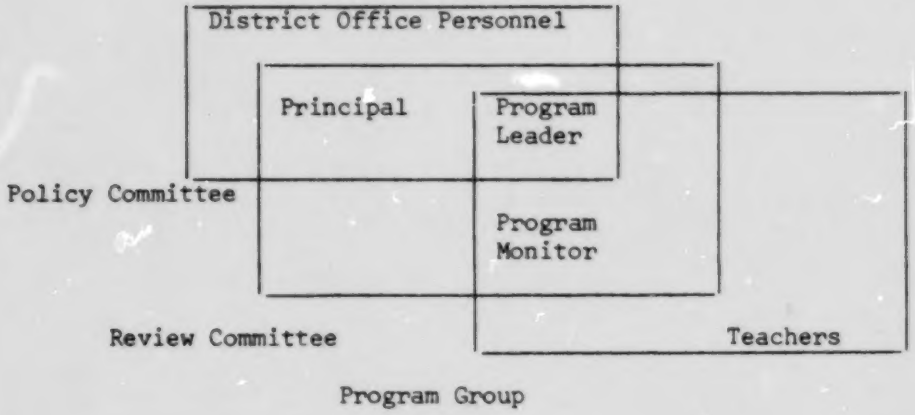


Figure I.1 Diagram of the overlapping groups

Table I.1

Committee Membership and Activities

Group (and Composition)	Functions
Program Groups (program leader, monitor, and faculty of the school)	1. To intepret survey results for their own group.
	2. To identify the group's key work problems and needs.
	3. To diagnose the basic reasons and causes underlying work problems.
	4. To determine what action can be taken at the school level in solving problems and meeting needs.
	5. To discuss problems and possible solutions with other members of the system who might be affected by the problem of proposed changes.
	6. To communicate to the Review (and/or Policy) Committee the group's thinking and recommendations regarding alternative proposals for solving problems and meeting needs.
	7. To obtain from the Review (and/or Policy) Committee reasons and explanations for existing top-level policies, programs, procedures, thinking and action.
	8. To plan for the implementation of solutions.
Review Committee (principal, program leader, and monitor)	1. To plan and schedule survey administration, feedback, and problem-solving meetings.
	2. To approve changes and innovations proposed by the Program Group.
	3. To explain why proposals for change cannot be approved and to suggest modifications of proposals for further consideration.
	4. To facilitate upward and downward communication between the Policy Committee and the Program Group.
Policy Committee (superintendent or district representative, principal, and program leader from the school(s) interested in the particular problem.	1. To respond to questions, suggestions, and recommendations of Program Group.
	2. To sanction and suggest changes in innovations emerging from Program Groups.

received aggregated questionnaire data generated by its own staff and by the personnel of the district as a whole. The data was task-oriented and school-specific, consisting of 155 items which tapped 14 areas of school functioning, including aspects of input, environment, process and output of the school. Members of the school district helped edit and add to the basic questionnaire before it was administered. Figure I.2 shows the 14 areas of school functioning which were tapped by the questionnaire. Figure I.3 illustrates the feedback form for one of those 14 areas.

Various components of the intervention helped to counteract some of the problems commonly associated with data-feedback change efforts (Mohrman et al, 1975). For instance, the leader and monitor from each school received up to three days of training in the feeding back of data, group processes, problem-solving techniques and aspects of planned change, thus reducing the reliance on external agents and increasing the probability that the organizational change effort would be sustained over time. These internal change agents fed back the data to the Program Groups and conducted ongoing Problem-Solving sessions. Furthermore, the program groups, through the leader and monitor, were provided with a formal problem solving process to guide their use of the data.

The process was formalized by a normative seven-stage group problem solving process (Cooke, 1973) which had its source in a number of related models (i.e., Rogers and Shoemaker, 1971; Zaltman, Duncan and Holbek, 1973; Stufflebeam, 1967). Many of these stages or subprocesses of group problem solving were linked in the program design to particular intervention components. Following are the definitions of the stages along with the manner in which they were designed into the intervention (see figure I.4).

FIGURE I.2

Hypothetical Summary Profile for Feedback

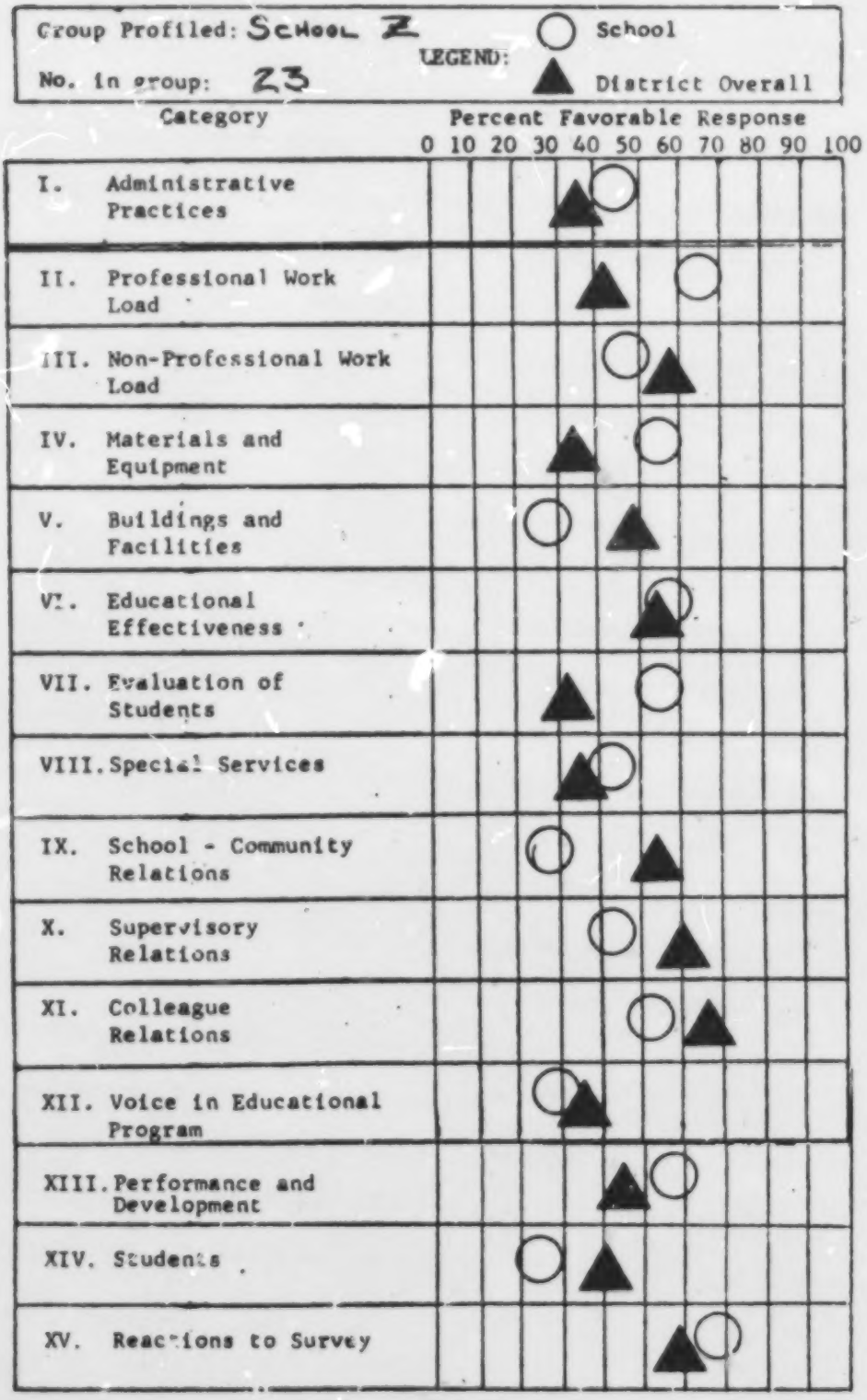
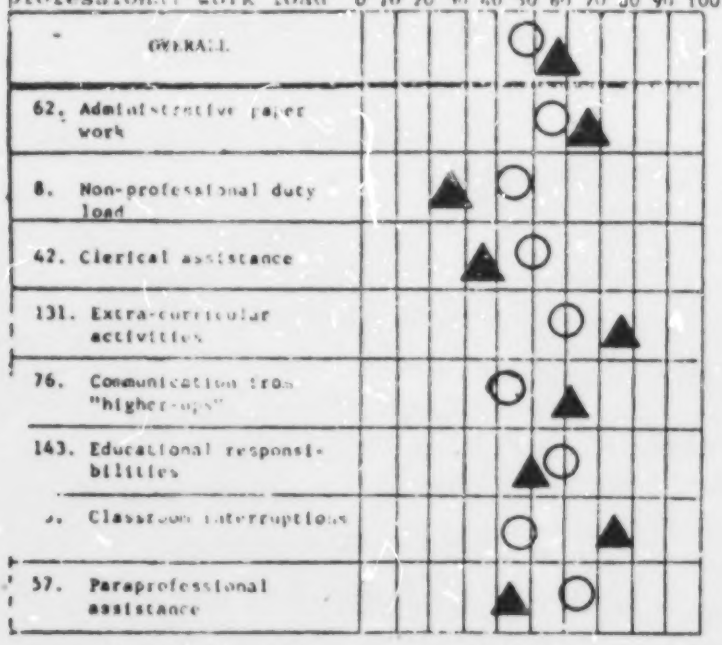


FIGURE I.3

Hypothetical Breakdown of Feedback Category



School			
%	%UF	NA	Mean
6	39	2	3.1
10	46	1	2.8
12	38	3	3.0
4	36	11	3.2
15	42	1	2.7
22	20	0	3.1
30	24	3	2.9
4	32	4	3.5

District			
%	%UF	NA	Mean
7	27	19	3.3
5	70	6	1.9
20	45	31	2.3
6	18	51	4.1
25	14	8	3.2
10	31	4	3.1
18	7	28	3.1
6	51	55	2.7

		FR
62.	I am required to do too much administrative paper work (attendance reports, tardy slips, statistical reports, etc.)	D
8.	I am required to perform too many non-professional duties here (playground, hall, stairs, lunchroom and study hall duties).	D
42.	I receive sufficient clerical assistance to do my job effectively.	A
131.	So far as I am concerned, extracurricular duties (sponsoring student clubs and activities, etc.) are distributed fairly here.	A
76.	I am asked to read too many communications from "higher-ups" in this school system.	D
143.	This school assumes too many educational responsibilities that properly belong in the home or to other community agencies.	D
15.	Interruptions (messages, monitors, intercom bulletins) are kept to a minimum here.	A
57.	A proper amount of paraprofessional assistance is available to the teachers in this school.	A

Evaluation refers to the collective identification of problems and decision situations. This stage was performed by the program group under the leadership of the group leader. This stage was initiated with feedback of the survey results. The training of the leader was reinforced by provision of a manual documenting specific guidelines and procedures to be used by the group in this and subsequent stages.

Solution generation is the development of alternative suggestions and potential solutions to identified problems, and the selection of preferred solution(s). This took place in the program group under the leadership of the leader and process guidance of the monitor. Guidelines, forms, and training were provided by the interventionists. Much of the content of these materials and some of what were provided in the evaluation stage had its source in Maier (1963).

Internal Diffusion refers to the provision of participation in the problem-solving process for those with information relevant to and who will potentially be affected by any contemplated solution. This was a responsibility of the program group. Groups and leaders were urged to use district resource personnel, when appropriate.

Legitimation refers to communication of proposed solutions to the authority structure for sanction, if needed, and for reactions and input, in any case. The forum for this stage is the review group (and policy group, if needed). The communication is facilitated not only by the overlapping membership with the program group but also by the provision of structured forms which enhance the probability that solutions presented will be carefully analyzed and planned and that responses to the program group will be considered and constructive. These forms not only enhance

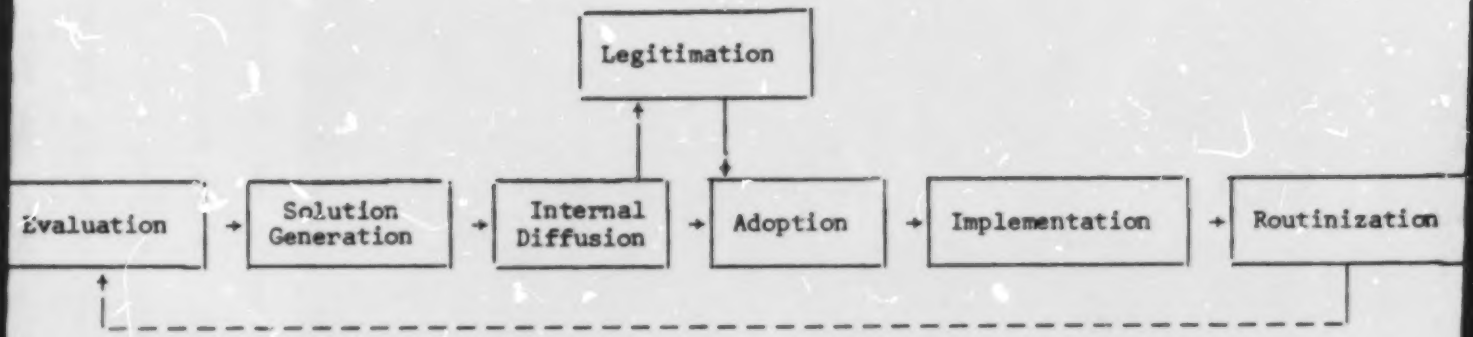


Figure I.4 The collective decision process.

this stage but facilitate earlier stages by asking monitors to systematically record the reasons behind the problems identified and the solutions recommended as the group problem solving process is carried out. Later stages are also facilitated by these forms in that they call for timetables and specific plans of action as part of proposed solutions.

Adoption is acceptance of solution by those who will implement it and specification of final plans of action. Successful completion of this stage is anticipated by the high participation of teachers and others in previous stages.

Implementation is putting the solution into practice. Again, this is performed by various personnel, generally including members of the program group, and is facilitated by the acceptance gained during earlier stages as well as the forms and documentation provided.

Routinization is the evaluation of the change or implemented solution and the identification of and solving of problems associated with it, until the change becomes "standard operating procedure." This is performed by the program groups and is facilitated by their experience in and learning of the problem solving process itself.

Hypotheses

The next section of this paper describes the experimental design used to evaluate or test the design of the intervention and, by implication, the theoretic base upon which it was built. The hypotheses which underlie that evaluation are presented here. There are three levels of hypotheses which are investigated, labeled primary, secondary, and tertiary to reflect the relative immediacy with which the outcomes were expected to occur.

Primary Hypotheses: At the most fundamental level the intervention needs to affect those phenomena which it seeks to manipulate. In this case, the intervention was aimed at changing the decision making structure of the schools through superimposition of the collegial structure, and at changing the process by which problems were dealt with by the provision of the seven-stage group problem solving process.

Primary Hypotheses: Structure: School structure will change commensurate with the structural properties of the intervention in its combination with existing school structures.

Group Problem Solving: The degree of group problem solving in schools will increase as a result of the OD intervention.

As mentioned, the testing of these hypotheses amounts to a manipulation check of the intervention. In the case of structure, we expected 1) it to become more standardized reflecting the highly formalized intervention, 2) task variety to increase because of the augmented roles, 3) hierarchy of authority to decrease due to the lower level decision making, and 4) autonomy to remain constant due to the feeling of increased professional control through group problem solving offset by the pressure of being constrained by the same process. We expected the intervention to enhance the occurance of each stage of the group problem solving process.

Secondary Hypotheses: If indeed the primary hypotheses are verified then this should have secondary effects on the distribution of influence within the school. Note that the earlier arguments were theoretically based on the assertion that there is much going on in schools which is not under anyone's control or influence. Thus distribution of influence should be marked by an overall increase in the influence of all personnel but especially teachers. Loss of influence is not expected for any position.

The degree of influence is expected to be directly related to the degree to which individuals participate in decision making and this of course was expected to increase as a result of the intervention.

Secondary Hypotheses: Participation in Decision Making will increase as a result of the intervention.

Influence which teachers have over school matters will increase. Principal influence will not decrease.

Tertiary Hypotheses: The contingency theory arguments essentially predict that organizations appropriately structured to "fit" their environments will be more effective in performing, or at least in achieving valued outcomes. The intervention should result in a better school-environment fit because of its increased adaptiveness to the technical environment through the collegial structure. This adaptiveness should be reflected by the choice of ends which are emphasized and toward which resources are allocated by the school. This in turn should be reflected in increased effectiveness in achieving organizational goals. At the individual level, increased participation in a collegial process should lead to the increased probability that one's needs will be taken into account in organizational decision making, thus increasing the probability of those needs being satisfied.

Tertiary Hypotheses: Resources and Emphasis on school goals will increase as a result of the intervention.

The Effectiveness with which goals are met will increase as a result of the intervention.

Individual Satisfaction will increase and role stress decrease as a result of the intervention.

II. METHODOLOGY

Introduction

The research design in the intervention was quasi-experimental, with eight experimental and eight control schools from the same school districts. Pre and post measures are available from all schools. Separate questionnaires were administered for survey-feedback and project evaluation purposes. Both school-specific and general organizational variables were measured. In addition, a large amount of interview and observational data was collected and used to supplement and interpret the questionnaire results.

Because of self-selection into the two conditions, experimental and control schools can not be considered equivalent, and alternative hypotheses cannot be ruled out. The strong research design in the pilot test and the clearly significant findings of that study, however, lend evidence that changes measured in this study are program effects (Coughlan, et al., 1972).

Two kinds of data analysis are reported. Organizational and individual level t-tests comparing pre and post test scores were performed. In addition, a two-way analysis of variance was performed to detect significant time x participation group interactions (Nunnally, 1976), which would provide additional evidence that changes were due to the O.D. program despite the initial non-equivalency of the two groups.

The Setting

The experimental OD program was implemented in the public schools of a small midwestern city with a population of 65,000. The research team chose this school district because it represented the challenges of an urban school district (e.g., collective bargaining, a racial and socio-

economic mix, economic problems) and yet was small enough (22 schools) to treat effectively with available research funds. The superintendent in the district was receptive to the idea because the intervention design appeared to address communication problems which he perceived as existing in the district.

Although secondary schools in the district were invited to participate in the OD activities, only one of the five chose to do so. Elementary schools also self-selected into the program. Eight schools elected to participate in the OD activities. Nine others provided data, but did not participate in any OD activities.

Research Design

The research design is a variation on the following basic experimental design:

Groups	Pre-test	Intervention	Post-test
G_a	O_1	X	O_2
G_b	O_1		O_2

The particular situation, however, demands a more explicit notation which reflects the alterations necessarily made to the basic design. Table II.1 presents the modified design. The following discussion further specifies the particulars about the pre and post observations and the various components of the intervention or experimental treatment.

Pre-test and post-test. Essentially two questionnaires were used here, a school-specific survey feedback questionnaire and a more general questionnaire measuring organizational characteristics for project evaluation purposes. The results from the evaluation questionnaire were not made available to the district until the termination of the project.

Table II.1

Overview of Research Design and Timetable

School Group	First Year: Pre-Test — Evaluation Questionnaire and School Survey	First Year: Intervention/Treatment — Training	First Year: Intervention/Treatment — Experimental Components	First Year: Intervention/Treatment — Interim Interview	Second Year — Training	Second Year: Post-test — Evaluation Questionnaire with School Survey	Second Year: Continuation — Feedback
	February 1975	February 1975	February-March 1975	June 1975	October 1975	February 1976	March-April 1976
Participating	S_1 O_1	T_1	$FB(S_1)$ - PS_1	I	T_2	$(SO)_2$	$FB(SO)_{12}$
Non-Participating	S_1 O_1		$FB(S_1)$ only			$(SO)_2$	$FB(SO)_{12}$

S_1 = School Feedback Survey time one

O_1 = Evaluation Questionnaire time one

S_1 and O_1 = School Survey time one and evaluation questionnaire time one were administered separately

$FB(S_1)$ = Feedback of survey results (S_1)

$FB(SO)_{12}$ = Feedback of all questionnaire data collected comparing time-one and time-two results, essentially data "handback"

PS_1 = Refers to three two-hour released-time sessions for the groups as part of the start-up; all subsequent group sessions are considered to be effects of the intervention

SO_2 = Combined School Feedback Survey and Evaluation Questionnaire time one

T = Training

I = Interview

Instead of being classified as post-test and pre-test, the School Feedback Surveys could also be considered as part of the intervention. The two questionnaires were administered at separate times during the pre-test stage. At district request, shortened versions of the two were combined into one instrument requiring a single administration for the post-test measures. It is only on these repeated measures that the effects of the intervention can be measured.

Training. There were two training periods. The first took place roughly at the time of the pre-test questionnaire administration. The second was held at the beginning of the second academic year and was aimed at complete training of new replacement personnel and refresher training of continuing personnel.

Feedback. The first year feedback was handled in two ways. In each of the participating schools the trained personnel from that school fed back the data in the first formal meeting of the school group. In almost all of the non-participating schools, an after-school feedback session for the faculty was conducted by a member of the research team. In the remaining schools, the data were handed back to the principal.

The second year, feedback was in all cases in the form of "data handback." In the participating schools, no formal feedback sessions were held as a part of the research design. Participating schools which did feed the data back according to the OD design did so on their own time and at their own initiative.

Problem-solving process and structure. This part of the intervention was communicated at training, where the skill transfer also took place. The research design provided for active implementation of these intervention components and survey feedback by setting aside three two-hour problem-

solving sessions for the school groups in February and March of the first year. Time for those initial sessions was partially set aside by the participating faculty members. No other formal released time was set aside by the research design. Any additional problem-solving meetings and uses of the structural components of the OD program were at the initiative of the school personnel.

Groups. Ideally, the membership of the experimental and control groups should be randomly determined. As we have seen, this was not the case in this program. The participating schools self-selected. Thus the design is a non-equivalent control group design and, as such, any results of the design will be open to alternative interpretations which would explain any differential changes in participating schools by the bias in the original sample of experimental schools.

Nevertheless, the presence of the non-equivalent control group is much better than having no control group at all. The fact that both groups are drawn from the same district means that, by and large, the same external forces are operating in all schools. Any changes in the states of the schools which are caused by changes in their environments--such as superintendent turnover, school board actions, legal decision, etc.--will most likely apply across the board and therefore can potentially be separated out statistically. These external effects could not be distinguished from experimental effects in the participating schools were it not for the trend comparisons made possible by the availability of the "controls."

Data Analysis. The presence of a non-equivalent control sample in a longitudinal field experiment creates two confounding tendencies which must be taken into account in statistical data analysis. First,

there are liable to be natural or externally caused changes taking place in all schools over the time frame of the analysis. Second, it is likely that the participating and non-participating schools are, due to the selection procedure, systematically different in their organizational states. Given these two a priori sources of variation, they must be statistically accounted for and removed so that the only remaining patterns are those which change over time and which show different patterns of change for the participating and non-participating schools. A two-way analysis of variance (two-way ANOVA) does this when the independent, qualitative variables are time (levels equal pre-test and post-test) and participation status (levels equal participating and non-participating). The dependent variables are the various measures of organizational states which are explained later in this chapter. This 2 x 2 design will identify effects ostensibly due to the presence of the OD program as statistical interactions between time and participation status. An extended discussion of this type of analysis for this type of situation is made by Nunnally (1976). In his treatment of this issue, Nunnally presents the case for the above type of analysis as the most legitimate treatment of the non-equivalent control group design.

At the same time, we recognize the potential constraints that a pure quasi-experimental design will create on the potential knowledge to be gained from program evaluation (Glaser & Strauss, 1967; Ross & Cronbach, 1976). Some of this additional knowledge can be gained by process evaluation (Duncan et al, 1977; Mohrman et al, 1977). However, statistical analysis of the data can also be used to gain useful

insights. A simple technique which we have utilized is the presentation of Student 't's for the pre- and post-test measures for both the participating and non-participating samples. Although not a rigorous test of program effects, it allows the reader to get a feel for the pattern of changes which occurred.

In this same spirit of increasing the interpretive usefulness of the data by maximizing the changes of discovering pattern tendencies, we report all our significance tests in this paper at both the individual and school levels of analyses although, strictly speaking, the school is the proper unit of analysis when evaluating a school level intervention. Purely for the sake of simplicity we have, in the various tables, presented only the means used in individual level analyses. In point of fact, these are quite close to the means used for organization level analyses. In general, most t-tests which are significant when done at the inidividual level also achieve significance at the organization level. The ANOVA's generally did not achieve significance at the organization level.

Since high schools and junior high schools are qualitatively, quantitatively, and organizationally very much different from elementary schools, and since only one secondary school participated in the program, we omitted these schools from our analyses in this chapter. We focus solely on elementary schools. One non-participating elementary school was omitted from the analyses because of a very low response rate on the questionnaire. Thus, eight participating and eight non-participating schools are used in the organization level samples. Only the respondents from each of these two sets of eight schools were used as the individual level samples.

As a final measure to ensure a relatively straightforward presentation we have limited the content of our discussion to individual level results. In almost all cases, the comments are valid for organizational level results, also.

Measures

This section briefly presents the measures which were taken through the evaluation questionnaire. The final report for the project (Duncan et al, 1977) contains complete information, including the items making up questionnaire scales and the reliabilities of those scales. Measures are discussed in the order of the hypotheses to which they apply.

Structure is measured by four scales. Standardization refers to the extent to which there are specifically defined rules and procedures to be followed (Hall, 1977). Hierarchy of Authority measures the degree to which decisions and problems must be referred upward (Hall, 1977). Autonomy and Variety refer, respectively, to the degree of discretion and non-routine activities associated with school tasks (e.g., Porter, Lawler, and Hackman, 1975).

Group Problem Solving is measured by seven scales which correspond to the seven steps problem solving process discussed at length earlier. The scales tap the degree to which the school tends to identify and solve problems through collective means.

Influence: Teachers were asked to estimate the degree of influence they perceived each of 10 groups or entities to have over school policies and programs. These were: students, teachers, principals, central office, board of education, parents, AFT (the local bargaining agent), state and federal governments, and community agencies. The

separate items were not scaled.

Participation in Decision Making: Following Alutto and Belisco (1972, 1973) we measured perceived participation in school decisions by asking teachers to report the degree to which they actually participate in 12 common decision areas in schools. These 12 areas factored quite clearly into 2 domains of decisional participation (Mohrman, Cooke, Mohrman, 1978). The "technical domain" consisted of the following areas: selecting texts, resolving student learning problems, determining instructional methods, establishing instructional policies, and establishing disciplinary policies. The "Administrative domain" consisted of: hiring professional personnel, planning budgets, determining professional assignments, resolving grievances, planning facilities, resolving problems with community groups, determining salaries.

Resource Allocation and Goal Effectiveness: Teachers were asked to respond to a list of 10 common goals or objectives of schools by estimating 1) the degree to which each goal received emphasis and resources in their schools and 2) the degree to which they felt the goal was being accomplished by their school. The former is an estimate of resource allocation across goals, the latter an estimate of goal effectiveness. The individual goals were not scaled.

Satisfaction and Stress: Individual level reactions to the job are measured using adaptations of common measures in organizational literature. Intrinsic and Contextual Job Satisfaction refer to our interpretations of two dominant factors resulting from a set of items derived from Porter's needs satisfaction questionnaire (Porter and Lawler, 1968). Role Ambiguity and Role Overload are scales made up

of items from a variety of sources dealing with these commonly used contructs (e.g., Rizzo and House, 1977).

In addition to the above measures, the results section will report data obtained by other means, chiefly interviews.

III. RESULTS

Comparison of Experimental and Control Groups. The fact of self-selection into the experimental or control group necessitates an exploration of the initial extent of non-equivalency between the two groups and resultant implications for validity of the evaluation results. Self-selection occurred after most faculties had been familiarized with the nature of the OD program, and before the questionnaire administration. It was expected that the schools which opted to participate would be those in which there was a felt need for a program of this type to address problem-areas in the school. In general, the participating school teachers perceived a higher degree of hierarchy of authority, less problem solving activity, and a lower amount of goal effectiveness than teachers in non-participating schools. In addition, participating schools measured lower in teacher satisfaction and cohesiveness on the evaluation questionnaire scales, and less favorably in teacher perceptions of many aspects of their school on the feedback survey.

The extent to which the measured differences between the two groups reflect actual differences in organizational state rather than a rationalization of the decision to participate in the OD program cannot be definitely guaged. Interview and observational data suggest,however,

that, consistent with the data, several of the participating schools were in reality characterized by a relatively low state of organizational health and that the ranking of schools on various organizational variables had been relatively constant during the years prior to the intervention. If there indeed had been a historical pattern of non-equivalency, it makes it less likely that changes in measures on the post-test represent regression of the participating and non-participating groups toward the overall sample mean rather than program effect (Cook and Campbell, 1976). In this particular quasi-experiment, that threat to validity is also reduced by the ability to compare patterns of changes in data with program effect measured in the pilot test of the same intervention which utilized a field experimental design (Coughlan et al, 1972). Similarities in results in the two research programs provides evidence that true program effect is being reported.

Tests of Hypotheses

Primary Outcomes: Table III.1 provides the summative evaluation data that was obtained from questionnaires. Primary program effects which should reflect implimentation of the OD program itself were expected to be an alteration in the organization structure and an increase in the group problem-solving and change processes in the schools. T-tests indicate that two aspects of structure, Standardization and Task Variety increased significantly only in the participating schools, presumably reflecting the highly standardized nature of the intervention and the addition of group problem solving activities to the pre-existing roles of teachers in those schools. Hierarchy of Authority and Autonomy did not change significantly in either control or experimental group.

TABLE III.1

Changes over Time on Evaluation Questionnaire Scales:
Significant Changes for Participating and Non-participating Samples (t-tests)
and
Significant Interaction Effects between Change and Program Participation (two-way ANOVA's)
Individual and Organization Level Analyses

	Participating Samples						Non-participating Samples				
	$\bar{x}$ Pre-test	$\bar{x}$ Post-test	Change	t_{ind} (N=120) [1]	t_{org} (N=8) [2]	Individual Level Interaction Effect (time x participation) [3]	$\bar{x}$ Pre-test	$\bar{x}$ Post-test	Change	t_{ind} (N=100) [1]	t_{org} (N=8) [2]
Environment											
Environmental influence on policy and programs											
Students	2.38	3.08	+	-4.40***	-6.80***		2.54	2.79	+		
Teachers	3.26	3.57	+	-2.92**	-2.83*		3.44	3.44	-		
Principals	4.04	4.09	+				4.12	4.05	-		
Central office	4.34	4.63	+				4.19	4.28	+		
Board of education	4.44	4.26	-				4.23	4.31	+		
Parents	3.08	3.17	+				2.94	3.02	+		
The AFT and affiliates	3.14	3.09	-				2.91	3.03	+		
State government	3.15	3.92	+	-5.81***	-3.96**		3.06	3.69	+	-4.25***	-5.26***
Federal government	3.06	3.73	+	-5.82***	-3.42**		3.08	3.61	+	-3.57***	-4.70**
Community agencies (police, fire, etc.)	2.32	2.56	+	-2.22*			2.13	2.28	+		
Organization Structure											
Standardization	4.17	4.37	+	-2.17*			4.17	4.23	+		
Autonomy	4.16	4.25	+				4.20	4.28	+		
Variety	4.02	4.31	+	-2.47*	-2.58*		4.26	4.18	-		
Hierarchy of authority	3.45	3.38	-				3.07	3.15	+		
Organizational Process											
Problem-solving process											
Evaluation	3.10	3.81	+	-5.28***	-5.58***	*	3.60	3.82	+		
Solution generation	3.19	3.78	+	-4.86***	-5.30***	*	3.69	3.80	+		
Internal diffusion	2.51	2.94	+	-3.72***	-2.64*		2.80	2.88	+		
Legitimation	2.50	2.90	+	-3.13**	-3.16*		2.72	2.96	+		
Adoption	2.79	3.19	+	-3.41***	-3.92**		3.27	3.33	+		
Implementation	3.20	3.71	+	-4.18***	-3.70**	*	3.59	3.68	+		
Routinization	3.22	3.65	+	-4.18***	-2.90*	*	3.69	3.75	+		
Participation in decision making											
Actual participation in policy decisions	1.52	1.59	+			*a	1.65	1.48	-	2.01*	
Should participate in policy decisions	3.04	3.02	-				3.03	2.98	-		
Actual participation in operational decisions	3.39	3.54	+			*	3.49	3.46	-		
Should participate in operational decisions	4.29	4.30	+				4.28	4.29	+		

TABLE III.1 (continued)

	Participating Samples					Individual Level Interaction Effect (time x participation)	Non-participating Samples				
Resource Allocation Process	$\bar{X}$ Pre-test	$\bar{X}$ Post-test	Change	t_{ind} (N=120)	t_{org} (N=8)		$\bar{X}$ Pre-test	$\bar{X}$ Post-test	Change	t_{ind} (N=100)	t_{org} (N=8)
Amount of attention and resources											
1. Develop highly qualified staff	3.36	3.67	+	-2.76**			3.61	3.66	+		
2. Implement comprehensive and integrated instructional program	3.33	3.73	+	-3.97***	-4.22**		3.47	3.74	+	-2.17*	-3.63**
3. To provide positive and supportive school environment	3.42	3.75	+	-3.17**	-4.44**		3.69	3.81	+		
4. To provide ongoing evaluation of school programs for modification and development	2.88	3.38	+	-4.72***	-6.22***		3.11	3.37	+	-1.84	
5. To experiment with educational innovations	3.09	3.08	-				3.31	3.28	-		
6. To be responsive to community	3.04	3.43	+	-3.81***	-4.66**	+	3.43	3.44	+		
7. To communicate to public objectives and results of school programs	2.72	3.07	+	-3.15**	-5.04**	+	3.18	3.16	-		
8. To promote educational achievement of minority students	3.27	3.35	+	-2.08*	-4.84**		3.51	3.72	+		
9. To coordinate school activities with relevant community groups	2.73	2.84	+				2.90	2.89	-		
10. To lessen disciplinary problems	3.37	3.49	+				3.42	3.54	+		
Organizational Effectiveness											
Goal effectiveness											
1. Develop highly qualified staff	3.29	3.50	+				3.56	3.51	-		
2. Implement comprehensive and integrated instructional program	3.16	3.37	+	-2.04*			3.37	3.42	+		
3. To provide positive and supportive school environment	3.28	3.47	+				3.51	3.65	+		
4. To provide ongoing evaluation of school programs for modification and development	2.76	3.10	+	-3.15**	-5.76***		3.04	3.05	+		
5. To experiment with educational innovations	2.96	2.89	-				3.13	3.07	-		
6. To be responsive to community	2.87	3.20	+	-3.22***	-2.64*	+	3.20	3.22	+		
7. To communicate to public objectives and results of school programs	2.69	2.99	+	-2.99**	-5.27***	+	3.04	2.98	-		
8. To promote educational achievement of minority students	2.90	3.11	+				3.25	3.32	+		
9. To coordinate school activities with relevant community groups	2.81	2.81	+				2.86	2.90	+		
10. To lessen disciplinary problems	3.05	3.09	+				2.98	2.94	-		

TABLE III.1 (continued)

	Participating Samples					Individual Level Interaction Effect (time x participation)	Non-participating Samples				
	$\bar{X}$ Pre-test	$\bar{X}$ Post-test	Change	t_{ind} (N=120)	t_{org} (N=8)		$\bar{X}$ Pre-test	$\bar{X}$ Post-test	Change	t_{ind} (N=100)	t_{org} (N=8)
Integration											
Role behavior											
Role overload	3.07	3.10	+				3.16	3.30	+		
Role ambiguity	2.45	2.29	-	2.15*			2.28	2.21	-		
Job satisfaction											
Intrinsic satisfaction	4.50	4.82	+	-2.95**	-3.19*	+	4.76	4.66	-		
Contextual satisfaction	4.10	4.50	+	-3.44***	-3.92**		4.41	4.54	+		
Cohesiveness	4.56	4.75	+				4.85	4.69	-		

*Significant at $p < .05$.

**Significant at $p < .01$.

***Significant at $p < .001$.

[a]Significant interaction effect at organizational level.

[1]Two-tailed t-test, between pre-test and post-test groups.

[2]Two-tailed t-test, using paired groupings.

[3]F statistic used to determine the probability that measured interactions occur by chance.

Teachers in the participating schools, but not in the non-participating schools, perceived an increase in all seven stages of the group problem solving process. Significant two-way interaction effects (time x participatory status) emerged for four stages in the analyses of variance: Evaluation, Solution Generation, Implementation, and Routinization.

Qualitative interview and observational data confirms those primary effects. Table III.2 provides evidence that the groups were meeting, had relatively high attendance, and that many of the groups utilized the standardized communication forms as well as the standard change paradigm provided by the interventionists. Apparently the entire change process was followed in many program groups, as the solutions listed in Table III.3, all reached the implementation stage and many had been routinized by the time the second year ended.

Secondary Outcomes: As a result of increased group problem solving and structural change in the experimental schools, it was hypothesized that teachers would perceive an increase in the extent of their Participation in Decision Making and their Influence on the policies and programs in their school.

The data provided weak evidence that there were effects on the amount of perceived Participation in Decision Making. A very slight absolute increase in the measures of Participation in both Administrative and Technical decisions in the experimental sample combined with decreases in these measures in the control group to produce significant interaction effects in the analysis of variance.

Teachers in the experimental group perceived an increase in both

Table III.2 Use of Program Components by Participating Schools

Components	Elementary School Program Groups							
	A	B	C	D	E	F	G	H
First Academic Year								
Data								
Feedback Session	yes	yes	yes	yes	yes	yes	yes	yes
Groups								
Program Group								
Number of Meetings[a]	6	11	5	9	7	6	4	5
Percent of Attendance[b]	75	100	90	75	50	80	95	75
Review Group	yes	yes	yes	yes	yes	yes	yes	no
Process Guidance								
Seven Stage Model	yes	yes	no	yes	no	no	yes	no
Forms	yes	yes	yes	yes	no	no	yes	no
Second Academic Year								
Groups								
Program Group								
Number of Meetings	3[c]	11	5	15[d]	13[d]	12	0	---[e]
Percent of Attendance	95	100	100	60	50	75	---	---
Review Group	yes	yes	yes	yes	yes	yes	no	---
Process Guidance								
Seven Stage Model	no	yes	no	yes	yes	no	no	---
Forms	no	yes	yes	yes	yes	no	no	---
Data								
Feedback Session	no	yes	yes	yes	no	no	yes[f]	---
Third Academic Year								
Status	---	cont.	cont.	cont.	cont.	cont.	---	---

[a] Includes three initial released time meetings provided by research funds. [b] Percent refers to those participating after the initial three released time meetings. [c] Monitor left and was not replaced; the program was not really continued, although the leader was asked to call meetings regarding a particular problem. [d] Change in program group leadership. [e] Group formally voted to drop the program. [f] Attended by principal.

Table III.3 Problem Area and Solutions Implemented

I. Exchange of Professional and Task-Related Information
- Compiled list of community resources utilized by teachers
- Compiled list of teaching materials available in the school
- Teacher lunches to provide interaction opportunities
- Collected information and held meetings to decide on a new mathematics curriculum
- Met as faculty to give professional assistance to new teachers
- Comprehensive school calendar to facilitate coordination
- Meetings to share knowledge concerning innovative materials
- Communication of progress on referrals
- Determine priorities for use of limited special testing services
- Communication forms used to exchange information between teachers

II. Utilization of Resources Available such as Space, Materials, Time and Services
- Procedures for locating materials so accessible to all teachers
- Procedures to use paraprofessional or volunteer assistance to duplicate materials (2 schools)
- System to utilize library when part-time librarian not present
- Upgraded, catalogued and encouraged use of resource room
- Planned utilization of workshop day
- Developed work space for teachers (2 schools)
- Altered space utilization in building
- Priority system for use of testing services (also under I.)

III. Communication between Administration and Faculty
- Met with Central Office Personnel to:
  - -Clarify nature of psychological services that teachers felt should be available in the school
  - -Clarify procedures for identifying and placing students in special ed programs
  - -Point out problems being caused by special service shortage (2 schools)
  - -Get information concerning possibilities for and make requests for supplementary teaching materials
- Developed weekly bulletin for communication from principal to faculty
- Appointed agenda committee to request formal faculty meeting when needed

IV. Procedures for Grouping Children and Easing Movement between Learning Situations
- Procedures for communicating skills to promote continuity in child's program
- System to allow individualized reading instruction with movement of students between classrooms (3 schools)
- Guidelines for placing students in classes from one year to next
- Testing in basic skills to detect and place for remediation

V. Client-Oriented Curricular, Behavioral, or Development Areas Needing Stress
- Curricular and Extracurricular focus on citizenship
- Interdepartmental focus on basic skills
- Cutting down truancy and class-cutting

Table III.3, cont'd

VI. Contextual Irritants
- Decorated teacher lounge
- Secured Coke machine
- Locked schools doors during lunch
- Pass system for visitors
- Structural change in driveway and playground

VII. Other-School-Environment Interface
- Program to increase parental involvement in the school

their own influence and that of the students but no change in the influence of the principal over policy and programs. Increased student influence may reflect the improved ability to tailor the educational process to the needs of students as a result of problem-solving efforts by the teachers in each school. Changes in the perceived influence of government were registered in both experimental and control groups, and probably reflect general environmental occurrences such as a court ordered desegregation plan rather than the OD project.

Once again, qualitative data adds substance to these statistics. The list of solutions that were implemented reveals that many of the issues The Program Groups dealt with were coordinative or integrative in nature, and were not strictly administrative or instructional decisions. Thus, it is understood that items measuring perceived participation in "normal" administrative and technical decision areas did not change.

Structured interviews with leaders, monitors, and principals yielded information which stressed the essentially professional nature of the Program Group activities. Both teachers and principals felt that the major reasons for participation were to solve problems, increase teacher influence, and increase professional interaction. Many of the interviewees felt that teachers had become more influential in their schools as a result of the program. Principal influence, however, was in general not perceived to have changed. This lends some substantiation to the theoretical framework presented in the first chapter, which differentiates between problem areas requiring technical core problem solving and those requiring managerial problem solving. It seems that teachers as a group can become more active and influential in solving their

problems without detracting from the influence that they perceive their principal to have or that the principal himself perceives.

In general, the principal's role does not seem to have been weakened by the program. On the contrary, interviews with district office personnel revealed that the intervention had been beneficial to a couple of principals who, prior to the intervention, had been perceived as weak administrators but who appeared to gain influence as a result. Principals in participating schools may have become more knowledgeable concerning what is going on in the school and more active in communicating information. Increased two-way communication between teachers and principals was also reported by almost all parties as a major benefit of the program.

Tertiary Outcomes: The introduction of faculty level problem solving mechanisms and the consequent increase in perceived teacher influence over programs and policies was expected to result in an increase in the organizational attention and resources applied toward school goals that are valued by the teachers. Data in Table III.1 reveals a significant increase in the amount of attention and resources allocated to seven of the ten goals presented in the questionnaire, compared to one goal area in non-participative schools. Interaction effects (time x participatory status) were present in the analysis of variance of two goals involving responsiveness to the community and communication with the public. This provides further evidence of increased environmental adaptation.

If, as theorized, the O.D. project was appropriate to the environment, technology, and professional nature of the school staff, it was expected that organizational effectiveness would increase and teacher satisfaction and role variables would improve in the participatory schools. Organization effectiveness was perceived by teachers to have increased significantly in four goal areas in the participatory schools while it

changed very little in non-participative schools. Some objective credence can be lent to these effectiveness measures, as structured interview data at time two generated by district office personnel yielded external judgements of the effectiveness of each school which correlated strongly with self-ratings by the teachers in each school ($r = .80$, $N = 17$).

Finally, teacher job satisfaction increased and role ambiguity decreased in the participative schools, a pattern not found in the non-participative schools. Analysis of variance of intrinsic satisfaction scores yielded a significant interaction effect (time x participatory status). Participation in the problem-solving process and the experience of increased influence over policies and programs seem to have contributed to both the contextual and intrinsic satisfaction of teachers, as well as to have reduced the role ambiguity associated with their jobs.

A further indication of improved attitudes of teachers is the striking pattern of increase in favorability of the various scales in the feedback survey (Table III.4). General areas which showed significant improvement in the experimental schools but not in the controls included: Colleague Relations, Supervisory Relations, Administrative Practices, Teacher Performance and Development, Professional Workload, and Educational Effectiveness. This pattern of improvement in the school survey follows very closely the results of the pilot study.

IV. DISCUSSION

The previous section described the results of the summative evaluation, which presents "hard" data concerning program effect, including questionnaire data indicating some perceptual increases in favorability, documentation of problems confronted and solved by the Program Groups, and final interview data tapping the attitudes of district personnel toward the OD program.

TABLE III.4

Changes over Time on School Survey Scales:
Significant Changes for Participating and Non-participating Samples (t-tests)
and
Significant Interaction Effects between Change and Program Participation (two-way ANOVA's)
Individual and Organization Level Analyses

	Participating Samples					Individual Level Interaction Effect (time x participation)	Non-participating Samples				
	$\bar{X}$ Pre-test	$\bar{X}$ Post-test	Change	t_{ind} (N=120)	t_{org} (N=8)		$\bar{X}$ Pre-test	$\bar{X}$ Post-test	Change	t_{ind} (N=100)	t_{org} (N=8)
Client Relations											
School community relations	3.16	3.34	+	-2.61**	-3.27**		3.31	3.46	+	-2.05*	
Community influence	3.52	3.73	+	-2.27*	-2.63*		3.64	3.80	+		
Community interest	3.09	3.22	+				3.37	3.41	+		
Students	3.40	3.34	+				3.56	3.64	+		
Internal School Relations											
Colleague relations	3.25	3.45	+		-2.96*		3.38	3.50	+		
Professional support	3.37	3.52	+				3.56	3.65	+		
Staff integration	3.16	3.38	+		-3.31**		3.21	3.34	+		
Supervisory relations	3.10	3.37	+	-3.90***	-3.08*	*	3.74	3.71	-		
Administrative practices	2.50	2.86	+	-3.48***	-3.09*	*	2.74	2.88	+		
Professional Climate											
Performance and development	2.89	3.23	+	-3.19**	-2.72*	*	3.37	3.36	-		
Faculty voice in educational program	2.36	3.00	+	-7.69***	-8.23***		2.54	3.02	+	-4.68***	-4.61**
Participation in program setting	2.36	3.16	+	-7.91***	-8.70***		2.57	3.18	+	-5.20***	-6.28***
Responsiveness to faculty	2.39	2.83	+	-4.54***	-4.36**		2.52	2.84	+	2.83**	-2.67*
Facilities											
Materials and equipment	3.10	3.29	+				3.31	3.33	+		
Building and facilities	2.65	2.91	+	-2.46*	-2.68*		2.64	2.94	+	-2.56**	-2.87*
Work Load											
Professional work load	2.88	3.11	+	-2.22*		*	2.94	2.94	=		
Non-professional work load	3.44	3.56	+				3.28	3.24	-		
School Performance											
Educational effectiveness	3.10	3.45	+	-3.97***	-4.63**		3.33	3.46	+		
Evaluation of students	2.96	3.15	+	-2.27***			3.01	3.25	+	-2.31**	-3.76**
Cognitive evaluation	2.83	3.03	+				2.68	3.00	+	-2.70**	-2.38*
Student placement	3.06	3.26	+	-2.14**	-2.70*		3.32	3.45	+		
Special services	2.80	2.97	+		-3.15*		3.00	3.04	+		
Services for special children	2.88	2.97	+		-2.47*		3.06	2.96	-		
Services for student and staff improvement	2.71	3.03	+	-3.03**	-3.68**		2.86	3.10	+	-2.17*	

*Significant at $p < .05$.
**Significant at $p < .01$.
***Significant at $p < .001$.

At the conclusion of the two years of formal intervention, five schools indicated that their faculties had decided to proceed with the program for at least another year. Three schools had stopped program activities, one by formal vote and the others by tacit agreement. The district office indicated a willingness to cooperate with Program Group efforts of the five continuing schools, but there were no plans for any district-level encouragement of an expansion of the program. Final interviews with the major district office personnel yielded a positive assessment of the nature and potential benefits of the project, but a less positive assessment of the results of the project in their own district. Almost all ten district office personnel remarked that the preoccupation of administrators with superintendent turnover, court ordered desegregation, a teacher strike, and the annexation of another school district had detracted from the administrative attention and commitment that would have been necessary to enable the program to have a widespread effect in the district.

Despite this assessment, with which the interventionists reluctantly must agree, the experiences in this district have confirmed the general theoretical development calling for collective decision processes to supplement authority decisions in schools. Many of the teachers with whom we interacted felt frustrated by efforts to participate in authority decisions through the usual committees, as they felt that the resulting decisions often did not address the problems they confronted in their actual day-to-day teaching or that their input was ignored. A close look at the problem areas dealth with by the Program Groups indicates that the decisions and solutions produced by these groups did not involve the policies and programs which are generally conceived to be authority decisons, but dealt with how to make these programs work <u>at the technical core level</u>. Such areas as coordination of efforts of special and regular classroom teachers, deciding on student placement, passing

information from teacher to teacher concerning a child's progress, and exchanging more information about scheduling, materials, and resources in the school are all directly related to making the total effort in the school more effective and better coordinated. A major benefit of the OD effort that was reported by participants was the increase in communication between teachers. So often it was couched in terms like, "finally we are talking to each other about our work," that we can not help but feel that this sort of professional interaction is a need that has too long been frustrated in many schools.

Interview data provide some confirmation that roles did change as a result of the program, at least for the principal, leaders, and monitors. The increase in perceived variety in the jobs of teachers in participating schools that was reported in the questionnaire indicates that the roles of other teachers in these schools had also expanded. We have much evidence that the new structures, the Program Groups, and the Review Committees were implemented in five of the eight participating elementary schools and were routinized in three of those schools.

These new structures and roles appear to have been integrated with the authority structures in most of the schools. Many problem solutions received legitimation and even active assistance from building-level and district-level administrators. Interview data indicate that in most schools this integration was accomplished without loss of influence by the principal, even though the teachers as a group were beginning to perceive themselves as having more influence in their schools. Furthermore, it seems to have been accompanied by an increase in knowledge and awareness of the school situation and greater communication by both teachers and principals.

There were several schools where integration of collective decision-making structures with the authority structures was accomplished only by hard work and sensitivity on the part of the leaders and monitors. Two schools were still working to achieve such integration. One other school had terminated the project, at least partly because of the problem of fitting the Program Group into the pre-existing mode of functioning. This points to a problem which may have been insufficiently addressed in the theoretical development and evaluation of the context of schools, namely, the issue of power and influence in the schools. Our experience points out that professional problem solving was not welcomed by many principals and that several principals were not even willing to cooperate with such efforts. This appears to relate not only to their personal desire for power and influence, but also to the accountability and responsibility structure in school districts. More work needs to be done to conceptualize how this program fits into this structure, how to introduce it into a district in a way which does not threaten principals, or how to make more explicit the differentiation between the collective and authority structures and responsibilities.

In the theoretical development, we suggested that the introduction of collective decision structures should result in teachers having a greater sense of influence and experiencing more satisfaction with their work situation. Our questionnaire data indicate that over the duration of the intervention, teachers in participating schools began to participate more in operational or teaching decisions and that their satisfaction did increase during the course of the intervention to a greater extent than that of teachers in the non-partipating schools.

Organizational flexibility and organizational effectiveness were both predicted to increase as a result of the implementation of collective

decision structures and processes. Although we have no systematic data on the former, we do have strong evidence that there was an increase in problem-solving activities in the participating schools. This, coupled with the fact that the Program Groups were addressing different problems from a new perspective (i.e., the faculty as a group), would indicate increased organizational capacity to deal with its technical core environment. We have limited evidence that teachers in participating schools felt their schools were beginning to more effectively accomplish some educational goals. This OD intervention provides the teachers with a collective mechanism to adjust to the changing context and constraints under which they function and to identify ways to affect that context and to better achieve the educational goals in their schools.

One central administrator summed things up, from his point of view, when he said this OD program was capable of solving "little" problems. In schools in general, administrators are increasingly involved with "big" problems--strikes, desegregation orders, adoption of new programs, closing schools because of failing enrollment. Each decision made at that level creates lots of "little" problems at the school level which require adjustment and further change. The teachers need a way not only to affect these "big" decisions, but also to deal with their own local needs in order to continue to carry on and try to improve the education in their schools.

Thus, we do not view the development of organizational problem-solving capacities and the creation of collective decision-making structures as an end in itself. But we do suggest that for some school districts a serious effort to develop the problem-solving capabilities of its own employees might have more effect on the quality of education offered and be a better expenditure of resources than the adoption of yet another new program which

may cost a lot of money and yet never achieve acceptance.

The field research reported in this document gives us reason to believe that the basic model which was tested has the potential to increase the efforts of teachers to improve the education in their buildings, particularly if implemented in a district with strong administrative support. Because it involves skills and develops capacities that are "content-free" in that they do not address a particular substantive problem, the program should be especially beneficial during a time of rapid change in schools.

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